

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

1. (currently amended) A position sense interface for a micro-mechanical element, comprising:

a substrate;

at least one proof mass, said at least one proof mass including a first proof mass having a first section electrically isolated from a second section;

at least a first and a second electrically decoupled sense capacitors, said first capacitor comprising at least a first independent terminal on said first section of said first proof mass and a second independent terminal on said substrate, said second capacitor comprising at least a first independent terminal on said second section of said first proof mass and a second independent terminal on said substrate; and

position detection circuitry comprising a differential charge integrator with input-sensed, output driven feedback, said position detection circuitry detects a position of said at least one proof mass.

2. (original) The position sense interface of claim 1 wherein said integrator includes an operational amplifier having an input and an output, and an input sensing, output driving feedback circuit.

3. (currently amended) The position sense interface of claim 1, further comprising:
at least one switch in communication with said position detection circuitry;
wherein said position detection circuitry operates over a first non-overlapping time period when said at least one switch is in a first position and a second non-overlapping time period when said at least one switch is in a second position.

4. (original) The position sense interface of claim 2 wherein the feedback is common mode.

5. (original) The position sense interface of claim 2 wherein the differential charge integrator senses common mode.

6. (currently amended) The position sense interface of claim 2 wherein the feedback circuit is time a time multiplexed feedback circuit.

7. (currently amended) The position sense interface of claim 2 wherein the feedback circuit is frequency a frequency multiplexed feedback circuit.

8. (currently amended) The position sense interface of claim 2 wherein the feedback circuit is continuous time a continuous-time feedback circuit.

9. (cancelled)

10. (cancelled)

11. (currently amended) The position sense interface of claim 1 further including means for providing a compensating charge on each said sense capacitor.

12. (cancelled)

13. (original) The position sense interface of claim 1 further including a first and a second reference capacitor.

14. (original) The position sense interface of claim 13 wherein said first and said second reference capacitor are substantially equal.

15. (original) The position sense interface of claim 13 further including at least one binary weighted capacitor array in parallel with at least one reference capacitor.

16. (original) The position sense interface of claim 13 wherein a charge is applied to said

position detection circuitry by a changing voltage applied to said reference capacitors.

17. (previously presented) The interface of claim 1, wherein at least one of said sense capacitors is formed as part of a micromechanical structure formed in or on said substrate; and

said position detection circuitry is formed in and on said substrate, and includes an operational amplifier and a negative feedback circuit.

18. (cancelled)

19. (previously presented) The interface of claim 17 wherein said micromechanical structure further includes a second proof mass.

20. (cancelled)

21. (previously presented) The interface of claim 19 wherein said first and second sense capacitors are coupled in said feedback circuit.

22. (cancelled)

23. (cancelled)

24. (currently amended) The interface of claim 17 ~~wherein said operational amplifier includes at least a first input, and a first signal applied to said feedback circuit places said operational amplifier in unity gain feedback during a first non-overlapping time period. wherein:~~

~~said operational amplifier includes at least a first input; and~~

~~said position sense interface includes means for applying a first signal to said feedback circuit to place said operational amplifier in unity gain feedback during a first non-overlapping time period;~~

25. (currently amended) The interface of claim 17 wherein said means includes means for applying a second signal to said feedback circuit places to place said operational amplifier in a charge

integration mode during a second non-overlapping time period.

26. (cancelled)

27. (cancelled)

28. (cancelled)

29. (cancelled)

30. (cancelled)

31. (cancelled)

32. (cancelled)

33. (cancelled)

34. (cancelled)

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39. (cancelled)

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41. (cancelled)

42. (cancelled)

43. (cancelled)

44. (cancelled)

45. (cancelled)

46. (cancelled)

47. (currently amended) A position sense interface for a micro-mechanical element, comprising:
a substrate;
at least one proof mass;
at least a first and a second electrically decoupled sense capacitors, each of said first and second capacitors comprising at least a first independent terminal on said at least one proof mass and a second independent terminal on said substrate; and
position detection circuitry comprising a differential charge integrator with input-sensed, output driven frequency multiplexed feedback, said position detection circuitry detects a position of said at least one proof mass.